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भारतीय मानक

दूरनियंत्रण उपस्कर तथा तंत्र

भाग 1 सामान्य विचार

अनुभाग 3 शब्दावली

Indian Standard

TELECONTROL EQUIPMENT AND SYSTEMS

PART 1 GENERAL CONSIDERATIONS

Section 3 Glossary

UDC 621·398 : 001·4

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1993

Price Group 11

Power Line Carrier Systems and Associated Telecontrol Equipment Sectional Committee, LTD 25

NATIONAL FOREWORD

This Indian Standard which is identical with IEC Pub 870-1-3 (1990) 'Telecontrol equipment and systems — Part 1 : General considerations, Section 3 Glossary', issued by the International Electrotechnical Commission (IEC), was adopted by the Bureau of Indian Standards on the recommendations of the Power Line Carrier Systems and Associated Telecontrol Equipment Sectional Committee (LTD 25) and approval of the Electronics and Telecommunication Division Council.

The text of the IEC Publication has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

CROSS REFERENCES

In the adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
IEC Pub 371 (1984) International electrotechnical vocabulary — Chapter 371 : Telecontrol	IS 1885 (Part 50) : 1985 Electrotechnical vocabulary : Part 50 Telecontrol	Technically equivalent

Only the English language text of the International Standard has been retained while adopting it in this Indian Standard.

Indian Standard

TELECONTROL EQUIPMENT AND SYSTEMS

PART 1 GENERAL CONSIDERATIONS

Section 3 Glossary

INTRODUCTION

Standards and reports on telecontrol equipment and systems produced during the last few years by IEC Technical Committee No. 57 in different documents use a certain number of terms with specific meanings in telecontrol applications that are not yet defined in IEC Publication 50(371): International Electrotechnical Vocabulary (IEV), Chapter 371: Telecontrol (1984).

This report presents - in alphabetic order - these terms and their definitions and includes those terms that are already defined in IEV Chapter 371.

This report presents a comprehensive means of referring to terms with particular meaning in telecontrol systems and equipment that should also be used in future telecontrol documentation.

With respect to the current work on telecontrol documentation and the necessity of defining the new important terms, it should be emphasized that this report will be followed by addenda in due course.

1. Scope

This series of standards applies to telecontrol equipment and systems with coded bit serial data transmission for monitoring and control of geographically widespread processes.

2. Object

This report covers those terms which are specifically relevant to telecontrol techniques as well as other terms which are necessary for the understanding of telecontrol standards.

This report also gives, where applicable, references to other dictionaries of electrical and electronic terms.

Terms which are considered to be well known by readers of telecontrol standards are not included in this report. This applies particularly in the field of communications where such terms as, for example, "information" and "bit" are commonplace and well understood.

3. General

All terms are listed in alphabetic order. General telecontrol terms given in the IEV Chapter 371 are repeated with the reference to the IEV term number.

Other sources are identified by a figure in brackets after the definitions. The code is as follows:

(1) American National Standards Institute - "IEEE Standard Dictionary of Electrical and Electronics Terms" (1984).

(2) IEC Publication 50(351), Chapter 351: Automatic Control (1975) and Amendment No. 1 (1978).

(3) Document IEV 721(CO)1216: Telegraphy and data communication (September 1983). [Future IEC Publication 50(721), in preparation.]

(4) Standard ISO 2382: Data processing - Vocabulary:

- Part 09: Data communication (1984).

- Section 14: Reliability, maintenance and availability (1978).

(5) FED-STD 1037 (1982).

(6) IEC Publication 954: Process data highway, Types A and B (PROWAY A and B), for distributed process control systems (being printed).

(7) IEC Publication 271A: First supplement to IEC Publication 271: List of basic terms, definitions and related mathematics for reliability (1978).

Terms which are common in other fields and used in telecontrol, and for which no definitions may exist within other recognized international vocabularies, are explained in terms of telecontrol requirements.

List of terms

Absolute chronology; time tagging

Method of transmission of changes-of-state so that transmitted information is accompanied by data giving the registered time at which the changes occurred, within the time resolution (IEV 371-05-02).

Acknowledgement **see** *Positive acknowledgement; Negative acknowledgement*

Acquisition time

The minimum time for correct detection and processing of change of state.

Address

Part of a message identifying the source or its destination.

Adjusting command

A command used to change the state of operational equipment having more than two states (IEV 371-03-10).

Alarm

Information for attracting attention to some abnormal state.

NOTE - A transition from a normal into an abnormal state causes a visual and/or audible warning which has to be acknowledged. A transition from an abnormal into a normal state usually causes a change of indication and, in some applications, also causes a visual and/or audible warning which has to be acknowledged.

Analog signal

Signal in the form of a continuously variable value.

Application functions

The application functions cover the special needs of the process to which a telecontrol system is applied.

The application functions are divided into "Basic functions" and "Extended processing functions".

Asynchronous telecontrol transmission see *Start-stop telecontrol transmission*

Asynchronous transmission

Data transmission in which the time of occurrence of the start of each character, or block of characters, is arbitrary; once started, the time of occurrence of each signal representing a bit within the character, or block, has the same relationship to significant instants of a fixed time base (4)*.

Automatic generation control (AGC) see *Load-frequency control*

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* The numbers in parentheses refer to the references given in clause 3.

Auxiliary information

Information used in order to control the operation of a telecontrol system.

Availability

The availability of a unit or system characterizes its ability to perform its required function at any given moment.

Average transfer time

The average of the transfer time for every case of input of the primary signal with respect to the telecontrol system (IEV 371-08-18).

Balanced circuit; balanced line; balanced signal pair

A transmission line consisting of two conductors in the presence of ground, capable of being operated in such a way that, when the voltages of the two conductors at all transverse planes are equal in magnitude and opposite in polarity with respect to ground, the currents in the two conductors are equal in magnitude and opposite in direction (5).

Barrier device

A device for galvanic isolation of telecontrol equipment and the operational equipment (e.g. a relay, optocoupler or transformer).

Basic functions

Basic functions deal with all types of individual information from and to the operational equipment and the operator.

Baud (Bd)

The unit of modulation rate or the unit of transfer rate of signal elements of constant duration in a discretely-timed or digital signal; the number of bauds is equal to the reciprocal of the duration in seconds of the shortest signal element or of the unit interval in such a signal (3).

NOTE - For example, if the duration of the unit interval is 20 ms, the modulation rate is 50 Bd.

Binary state information

Monitored information of the status of operational equipment which is characterized by one of two states, for example, on/off (IEV 371-02-03).

Bit erasure probability

The probability that a received signal variable used to represent the value of a bit exceeds specified limits of tolerated signal quality.

Bit erasure rate

The ratio of the number of bits received with signals exceeding specified limits of tolerated signal quality to the total number of bits sent.

Bit error probability

The probability that a received bit will be inverted with respect to the corresponding bit sent (IEV 371-08-02).

Bit error rate

The ratio of the number of bits received inverted to the total number of bits sent (IEV 371-08-01).

Bit oriented data transmission see *Code transparent data transmission*

Bit rate

The speed at which bits are transmitted, usually expressed in bits per second [bits/s] (1).

Block

A sequence of bits transmitted as a unit, generally subdivided into fields of conveying information bits and error check bits.

Block code

A sequence of information bits completed by bits used for error detection or error correction.

Block error probability

The probability that a block be incorrectly received (IEV 371-08-04).

Block error rate

The ratio of the number of blocks incorrectly received to the total number of blocks sent (IEV 371-08-03).

Breaking capability

The current that a device is capable of breaking at a stated recovery voltage under prescribed conditions of use and behaviour (1).

Broadcast command

A command which is addressed to operational equipment at several or all outstations of a telecontrol network (IEV 371-03-16).

Byte

An ordered group of a fixed number of binary digits operated on as an entity (3).

NOTE - The word "byte" without qualification may be used as a synonym for octet.

Centralized absolute chronology

Transmission of change-of-state information with absolute chronology from different locations containing synchronized clocks (IEV 371-05-04).

NOTE - The resulting accuracy specification has to consider separating capability, absolute chronology and clock synchronization errors.

Change-of-state announcement

An announcement of a demand for the transmission of event information (IEV 371-04-03).

Channel

A single path for transmitting electric signals, usually in distinction from other parallel paths (1).

NOTE - The word "path" is to be interpreted in a broad sense to include separation by frequency division or time division. The term "channel" may signify either a one-way path, providing transmission in one direction only, or a two-way path, providing transmission in two directions.

Channel selecting system; common diagram system

A telecontrol system in which the control centre or master station selects any one of a number of outstations by switching the receiver and if necessary the command sender from one circuit to another (IEV 371-07-10).

Check command

A command for the purpose of ensuring that the telecontrol equipment is functioning correctly (IEV 371-04-08).

Check sequence; check sum

Part of a message used for error checking or error correcting purposes.

Code

A specified relation between two sets of characters.

Code transparent data transmission; bit oriented data transmission

Data transmission method that does not depend on bit sequence structures used by the data source.

Command

Information used to cause a change of state of operational equipment (IEV 371-03-01).

Command direction

The direction from the controlling location to the controlled process. This is normally the direction from the master station to the outstation.

Common alarm

The combination of all individual alarms into one alarm (IEV 371-02-14).

Common diagram system see *Channel selecting system*

Composite configuration see *Hybrid configuration*

Concentrator station

A station in a hierarchical telecontrol network at which the monitored information coming from outstations is concentrated for transmission to the master station and at which the command information is distributed to the outstations (IEV 371-06-02).

Control

Purposeful action on or in a system to meet specified objectives (2).

NOTE - Control may include monitoring and safeguarding in addition to the control action itself.

Control centre

A control centre is a location where a master station is located.

Control discrepancy switch; control discrepancy key

A discrepancy switch or key with additional command functions.

NOTE - The switch is usually of the self-return type. The command function is activated by moving the switch into an unstable position.

Controlled station see *Outstation*

Controlling station see *Master station*

Counted measurand; metered measurand; metered reading

The totalized number of increments.

Counter pulse; meter pulse

Pulse representing one incremental unit.

Chronological transmissions of change-of-state information see *Transmission of change-of-state information chronologically*

Cyclic time

The time interval between consecutive appearances of any information that is transmitted periodically (IEV 371-08-19).

Cyclic transmission

A transmission method in which the message sources are scanned and messages are transmitted cyclically according to a definite sequence (IEV 371-07-01).

Data circuit

A means of data transmission between two or more data terminal equipments (DTE).

Data circuit terminating equipment (DCE); line coupler

The interfacing equipment sometimes required to couple the DTE (data terminal equipment) with a transmission circuit or channel (5).

Data integrity

The ability of a communication system to deliver data from its originator to its destination with an acceptable residual error rate (6).

Data terminal equipment (DTE)

The functional unit of a data station that serves as a data source or a data sink and provides for the data communication control function to be performed in accordance with a protocol.

Data transfer rate

The average number of bits, characters, or blocks per unit time passing between corresponding equipments in a data transmission system (4).

Data transport functions; data transport services

All functions involved in the management of information transfer between stations.

Decision feedback, transmission with see *Transmission with decision feedback*

Decode

Reversing of coding to obtain original information.

Digital measured value

Digital representation of a measured value.

Digital pulse duration modulation (DPDM)

A modulation method in which the binary signal elements "0" and "1" are represented by pulses or pulse intervals of different durations (IEV 371-07-11).

NOTE - The ratio between the long and the short signal element duration, which depends on requirements of reliability and speed of the message transmission, is not necessarily an integer.

Discrepancy switch

A switch with optical position indication used to display two distinct states of operational equipment.

Discrimination see *Separating capability*

Dispatching centre; load dispatching centre

Centre for the control of an operational network for generation and/or distribution of electrical energy.

Double command

A pair of commands each of which is used to cause an operational equipment to change to one of two determined states (IEV 371-03-03).

Double-point information

Monitored information represented by two bits characterizing two determined states and two indeterminate states of operational equipment (IEV 371-02-08).

Example: 10 } represent
01 } determined states

00 } represent
11 } indeterminate states

Down time

The period of time during which an item is not in a condition to perform its required function (7).

Duplex transmission; duplex traffic

Data transmission in both directions at the same time (4).

Echo principle see *Transmission with information feedback*

Equipment failure information

Information indicating failure of telecontrol equipment (IEV 371-04-10).

Error burst

A limited sequence of bits in which the bit error rate is significantly higher than the average bit error rate.

Error detecting code

A code which conforms to specific rules of construction so that, if errors occur and the received message does not conform to the rules of construction, the presence of errors is detected.

Event information

Monitored information on the change of state of operational equipment (IEV 371-02-04).

Extended processing functions

Extended processing functions are derived from a set of basic functions by means of operational processing functions (e.g. performed by the central processing unit of the telecontrol system or by separate computer systems).

Faulty state information

Monitored information characterizing an indeterminate state of operational equipment, which state lasts longer than a specified time (IEV 371-02-10).

Fleeting information; transient information

Monitored information on a condition that may persist for a time which is so short that reliable detection and transmission requires storage in the input facility of the telecontrol equipment (IEV 371-02-11).

Fault state range

Anomalous operating conditions which may cause malfunctions of the equipment.

Frame

A sequence of bits containing information, control and check fields, and having a reliable means of indicating the start and end, for example by frame delimiting characters possibly in conjunction with a length field.

Frame delimiter

A combination of signal elements used to identify the beginning or the termination of a frame.

Frame transmission efficiency

The ratio of correctly transferred user data bits to the total number of bits in a frame.

Frequency shift keying (FSK); frequency shift modulation

That form of frequency modulation in which the modulating signal shifts the output frequency between predetermined values, and the output wave has no phase discontinuity (1).

Front-end processor

A processor which buffers and processes data entering or leaving a station.

Function command

A command which initiates the operation of an automatic sequencing device in order to achieve the required function (IEV 371-03-18).

Example: The command to change busbars for a feeder.

General interrogation command

An interrogation command requesting all outstations to transmit all their monitored information to their control centre (IEV 371-04-05).

Group alarm

The combination of several individual alarms into one alarm (IEV 371-02-13).

Group command

A command which is addressed to several operational equipments at one outstation (IEV 371-03-15).

Half-duplex transmission; half-duplex traffic

Data transmission in either direction, one direction at a time (4).

Hamming distance

The number of positions in which two code words of the same length differ from each other.

Hybrid configuration; composite configuration

A combination of several telecontrol configurations, such as multipoint-star and multipoint-partyline configurations (IEV 371-06-12).

Incremental command see *Regulating step command*

Incremental information

Monitored information on the alteration of a value by one or more units (IEV 371-02-06).

NOTE - Sometimes this alteration may only be in one direction, e.g. for counting purposes. In other cases, the alteration may be in two directions, e.g. higher/lower, forward/backward, left/right, etc.

Information capacity

The amount of different information in a telecontrol system that may be handled at the control centre or master station and at the outstations (IEV 371-08-13).

NOTES

1 The information capacity is often expressed by the number of commands and by the amount of monitored information which can be handled.

2 The information capacity of telecontrol equipment at the control centre or master station may be shared between several outstations.

Information transfer efficiency

The ratio of the information content of a message transferred from a data source and accepted as valid by a data sink to the total number of bits expended for the message transfer (IEV 371-08-12).

Information transfer rate

The average number of bits of information per second transferred from a data source and accepted as valid by a data sink (IEV 371-08-11).

Instantaneous measurand

The measurand that exists at the moment of acquisition.

Instruction command; standard command

A command which is input at a control centre and which indicates a standard instruction to operators in the control room of a manned station (IEV 371-03-17).

Examples: "Start generators" or "Adjust generator output to ... MW"

NOTE - The instruction command is distinguished from instructions transmitted by general communication means (e.g. teleprinter) in that it is input and transmitted by means of devices used in telecontrol systems for other purposes and therefore must be programmed in a similar manner to other types of commands.

Integrated total; Integrated value

The integral of a quantity over a time.

Interface

A boundary or point common to two or more systems or entities across which information or energy flow takes place.

Intermediate state information

Monitored information on an indeterminate state of operational equipment which may last a specified time (IEV 371-02-09).

Example: The state of a slow-moving disconnector while in transit.

Interrogation command

A command by which one or more outstations are requested to transmit information (IEV 371-04-04).

Interrogative telecontrol system see *Polling system*

Limit of accuracy of chronology see *Time resolution*

Line coupler see *Data circuit terminating equipment (DCE)*

Link

The data transmission facilities among interconnected stations.

Link layer

The link layer is that layer of the open system interconnection (OSI) reference model which performs and controls specified transmission service functions by means of a link protocol.

Load dispatching centre see *Dispatching centre*

Load-frequency control; automatic generation control (AGC)

The regulation of the power output of electric generators within a prescribed area in response to changes in system frequency, tie line loading or the relation of these to each other so as to maintain the scheduled system frequency or established interchange with other areas within pre-determined limits or both (1).

Load shedding

The process of deliberately removing preselected loads from a power system in response to an abnormal condition in order to maintain the stability of the system (1).

Local/Remote switch

A part of the control system of a station which allows the choice of local or remote operation.

Maintainability

Maintainability is the ability of a system or equipment, under given conditions of use, to be restored to full working order after detection of fault and to be maintained during normal working operation.

Maintained command

A command in which the output signal to operational equipment is maintained until the change of state is executed or until the end of a predetermined delay longer than the response of the slowest operational equipment; the duration of the output signal is independent of the duration of the initiating signal (IEV 371-03-05).

Maintenance

The combination of all technical and corresponding administrative actions intended to retain an item in or restore it to a state in which it can perform its required function (7).

NOTE - The required function may be defined as a stated condition.

Master station, controlling station

A location at which telecontrol of outstations is performed (IEV 371-06-01).

Maximum transfer time

The transfer time for the case in which the primary signal to the telecontrol transmitter is input at the most unfavourable moment with respect to the telecontrol system (IEV 371-08-17).

NOTE - The maximum transfer time may occur within a cyclic system if information is input just after scanning the corresponding input element or within a quiescent system if information is input just after the start of transmission of another signal block.

Mean repair time (MRT)

The mean time required by trained maintenance personnel on site, equipped with replacement parts and the recommended test equipment, to diagnose and to rectify the fault including retesting the equipment.

Mean time between failures (MTBF)

For a stated period in the life of a functional unit, the mean value of the periods between consecutive failures of the unit under stated conditions.

Mean time to repair (MTTR)

The arithmetic average of time required to complete a repair activity (1).

Measurand; measured value; measured variable

A physical or electrical quantity, property or condition that is to be measured (1).

Memoryless transmission channel

Transmission channel in which the signal specification of a transmitted bit does not depend on signals transmitted before that bit.

Message

Information transmitted as a unit which may be composed of one or several frames.

Meter pulse see *Counter pulse*

Metered measurand see *Counted measurand*

Metered reading see *Counted measurand*

Mimic diagram

A device for the symbolic display and control of a network or the states of the components of a network.

Monitored information

Information characterizing the state or the change in state of equipment in a monitored station and which is transmitted to a monitoring station (IEV 371-02-01).

Monitoring direction

The direction from the monitored process to the monitoring location. This is normally the direction from the outstation to the master station.

MRT see *Mean repair time*

MTBF see *Mean time between failures*

MTTR see *Mean time to repair*

Multiple point-to-point configuration

A telecontrol configuration whereby the control centre or master station is connected to more than one outstation in such a way that simultaneous data exchange is possible between the master station and every outstation (IEV 371-06-07).

Multipoint-party line configuration

A telecontrol configuration whereby the control centre or master station is connected to more than one outstation by a common link in such a way that at any time only one outstation may transmit data to the master station; the master station may transmit either data to one or more selected outstations or global messages to all outstations simultaneously (IEV 371-06-09).

Multipoint-ring configuration

A telecontrol configuration whereby the communication link among all stations forms a ring; the control centre or master station may communicate with each outstation using two different routes (IEV 371-06-10).

Multipoint-star configuration

A telecontrol configuration whereby the control centre or master station is connected to more than one outstation in such a way that at any time only one outstation may transmit data to the master station; the master station may transmit either data to one or more selected outstations or global messages to all outstations simultaneously (IEV 371-06-08).

Negative acknowledgement

A message indicating that monitoring or command information has been received incorrectly (IEV 371-04-02).

Network

A number of stations communicating with each other via transmission links.

Octet

A sequence of 8 bits, operated on as a unit.

Omnibus configuration

A telecontrol configuration in which any one of several stations may communicate with any other (IEV 371-06-11).

Operational processing functions

Operational processing functions convert information into signals and data in the operational equipment.

Outstation; controlled station; remote station

A station which is monitored or commanded and monitored by a master station (IEV 371-06-04).

NOTE - Sometimes the term "Slave station" or "Substation" or "Remote terminal unit" (RTU) is used.

Overall accuracy

The deviation between the destination and the source values of information which undergoes a conversion from digital to analog form, or vice versa, expressed in per cent of the nominal full range value.

Overall information transmission efficiency

The ratio of the correctly transferred information content of a message in bits to the product of the time required for the transmission of that message and the bit transmission rate.

NOTE - The calculation of the overall transmission efficiency shall consider delays caused by transmission of polling frames, acknowledgement frames, average delays expended for error recovery, round trip propagation delays of signals, etc.

Overall response time

The time interval between the initiation of an event in a sending station and the output, in the same station, of the associated response coming from the receiving station (IEV 371-08-14).

Overall transfer time

The time duration by which information is delayed after the actual event in the sending station and until presentation at the receiving station (IEV 371-08-15).

NOTE - The overall transfer time includes the delays due to the input peripheral device in the sending station and the corresponding peripheral output device at the receiving station.

Persistant command

A command in which the output signal to operational equipment persists for as long as the initiating signal is present (IEV 371-03-06).

Persistant information

Monitored information which persists long enough to be reliably detected and transmitted without storing in the input facility of the telecontrol equipment (IEV 371-02-12).

Persistant regulating command

A persistent command which during the time of execution causes continual change to a parameter (IEV 371-03-12).

Phase shift keying (PSK); phase shift modulation; phase shift signalling

Angle modulation in which each significant condition in a modulating discrete signal is represented by a specified phase of a periodic sinusoidal oscillation (3).

PLC-channel see *Power-line carrier channel*

Point-to-point configuration

A telecontrol configuration whereby one station is connected to another station by a dedicated transmission link (IEV 371-06-06).

Polling system, interrogative telecontrol system

A telecontrol system in which the monitored information is obtained upon request from the master station to outstations (IEV 371-07-09).

Positive acknowledgement

A message indicating that monitoring or command information has been received correctly (IEV 371-04-01).

Post-mortem analysis

The subsequent analysis of a sequence of operations that occurred before a certain event.

Power-line carrier channel; PLC-channel

The use of high-frequency signals to transmit data over transmission lines whose primary purpose is to transmit electrical power.

Primary station

A station that initiates a data transport service.

Probability of information loss

The probability that a message be lost (IEV 371-08-08).

Probability of residual information loss

The probability that the loss of a message be undetected (IEV 371-08-10).

Process

A set of operations which performs transformation, transportation or storage of material, energy or information.

Protocol

The rules for communication system operation that must be followed if communication is to be effected (5).

Pulse code modulation (PCM)

That form of modulation in which the modulation signal is sampled, and the sample quantized and coded, so that each element of information consists of different kinds or numbers of pulses and spaces (5)

Pulse command

A command in which the output signal to operational equipment is a single pulse of predetermined duration independent of the duration of the initiating signal (IEV 371-03-04).

Pulse length check

Error detection by supervising the duration of signal elements of a frame. If any such element is out of a specified tolerance the frame is detected as erroneous.

Pulse number check

Error detection by counting the number of signal elements in a frame. If this number is incorrect (e.g. by effect of noise) the frame is detected as erroneous.

Quiescent telecontrol system

A telecontrol transmission system in which equipment is normally alert but inactive and where information is transmitted only upon events (IEV 371-07-08).

Rate of information loss

The ratio of the number of lost messages to the total number of messages sent (IEV 371-08-07).

Rate of residual information loss

The ratio of the number of undetected lost messages to the total number of messages sent (IEV 371-08-09).

Real time

The actual time during which a physical process occurs.

Recovery time

The time between the end of a function and the new start of this function.

Redundant code

A code using more signal elements than strictly necessary to represent the intrinsic information (5).

Refresh time see *Updating time*

Regulating step command; Incremental command; step-by-step adjusting command

A pulse command which changes the state of operational equipment in predetermined steps (IEV 371-03-13).

NOTE - It is usual to have two distinct commands to adjust operational equipment in its two possible directions.

Reliability

The ability of a functional unit to perform a required function under stated conditions for a stated period of time (4).

Remote control

Control of an operation from a distance. This involves a link between the control device and the apparatus to be operated.

NOTE - The communication is performed by means of:
a) direct wire;
b) mechanical means;
c) other types of interconnecting channels such as PLC, microwave, UHF/VHF radio, fibre optics, etc.

Remote station, remote terminal unit (RTU), see *Outstation*

Residual error probability

The probability that a received message will contain undetected errors (IEV 371-08-06).

Residual error rate

The ratio of the number of undetected wrong messages to the total number of messages sent (IEV 371-08-05).

Restart time

The time taken for a telecontrol system to become fully operational following a power supply failure (IEV 371-08-22).

Return information

Monitored information indicating whether or not a command has been executed (IEV 371-02-05).

SCADA see *Supervisory control and data acquisition*

Secondary station

Station that answers to a remote data transport service request.

Security

The ability of a telecontrol system to avoid placing the controlled system in a potentially dangerous or unstable situation. It applies to the consequences of failures arising out of malfunctions of the equipment and from undetected information errors.

Select and execute command

A command whereby two successive actions are required to effect a change of state of an operational equipment; the first or "select" command energizes part of the control circuit which in turn causes confirmatory return information to be transmitted back; the second or "execute" command causing the full energization of the control circuit at the receiving station is transmitted only after receipt of this return information (IEV 371-03-19).

Selection command

A command used to connect one of several parts of an installation to a common equipment (IEV 371-03-14).

Example: The connection of one measurand at a time to a common display device.

Selective interrogation command

An interrogation command by which one outstation is requested to transmit the state information of one or more operational equipments (IEV 371-04-07).

Separating capability; discrimination

The minimum time by which events must be separated such that the sequence of their occurrence is determined correctly (IEV 371-05-01).

Set point command

A command in which the value for the required state of operational equipment is transmitted to a controlled station where it is stored (IEV 371-03-11).

Set point value

A control variable representing the desired value of a controlled variable.

Signal

A visual, audible or other indication used to convey information (1).

Signal element

A distinguishable part of a physical variable.

Signal quality detection

A measurement of the degradation in quality of the received signal, used for error control purposes (IEV 371-04-11).

Examples: - Signal-to-noise ratio falling below a given threshold.

- Pulse length exceeding a specified value.

Simplex transmission, simplex traffic

Data transmission in one pre-assigned direction only (4).

Single command

A command used to cause a change of state of operational equipment in one direction (IEV 371-03-02).

Single point information

Monitored information represented by only one bit characterizing two determined states of operational equipment (IEV 371-02-07).

Slave station see *Outstation*

Spontaneous transmission

A transmission method in which messages are transmitted only when an event occurs at the sending station (IEV 371-07-02).

Standard command see *Instruction command*

Start-stop transmission

Asynchronous transmission such that each group of signals representing a character is preceded by a start signal and followed by a stop signal (4).

Start-stop telecontrol transmission; asynchronous telecontrol transmission

A telecontrol transmission method which uses groups of isochronous signal elements, separated by time intervals of arbitrary durations (IEV 371-07-07).

Start time

The time taken for a telecontrol system to become fully operational after switching on (IEV 371-08-21).

Starting command

A command which initiates action of operational equipment (IEV 371-03-07).

State information

Monitored information on a characteristic condition of operational equipment. Characteristic conditions can assume two or more possibilities (IEV 371-02-02).

Station interrogation command

An interrogation command by which one outstation is requested to transmit all monitored information to its control centre (IEV 371-04-06).

Step-by-step adjusting command see *Regulating step command*

Step position information

Information on the position of operational equipment which can assume one out of a number of sequential positions

NOTE - The term "tap position information" may be used in relation to transformers.

Stop command

A command which stops action of operational equipment (IEV 371-03-08).

Supervisory control and data acquisition (SCADA)

A system that supervises and controls a geographically distributed process.

Suppression time

Time period during which the acquisition of erroneous changes of states, generated by noise or contact bounces, is suppressed.

Switching command

A command used to change the state of two-state operational equipment from one state to the other state (IEV 371-03-09).

Examples: "Switch-on/switch-off"; "open/close".

Synchronous transmission

Data transmission in which the time of occurrence of each signal representing a bit is related to a fixed time base (4).

Synchronous telecontrol transmission

A telecontrol transmission method which uses isochronous signals the elements of which are separated by time intervals whose durations are equal to or multiples of a unit time interval and in which telecontrol equipment is operating continuously at the same rate (IEV 371-07-06).

Tap position information see *Step position information*

Teleadjusting

The telecommand of operational equipment having more than two states (IEV 371-01-08).

NOTE – Teleadjusting can be achieved by repetitive single or double commands or transmission of set point commands.

Telecommand

The use of telecommunication techniques to cause a change in the status of operational equipment (IEV 371-01-06).

Telecontrol

The control of operational equipment at a distance using the transmission of information by telecommunication techniques (IEV 371-01-01).

NOTE - Telecontrol may comprise any combination of command, alarm, indication, metering, protection and tripping facilities, without any use of speech messages.

Telecontrol configuration

The combination of telecontrol stations and transmission links by which these stations are connected (IEV 371-06-05).

Telecontrol system

A telecontrol system serves for monitoring and control of processes which are geographically widespread. This includes all equipment and functions for acquisition, processing, transmission and display of the necessary process information.

Telecontrol transfer time

The time duration from the input signal from the peripheral equipment to the telecontrol equipment at the sending station, to the output signal from the telecontrol equipment to its peripheral equipment at the receiving station (IEV 371-08-16).

NOTE - The telecontrol transfer time includes time delay for signal conversion, coding, etc., in the telecontrol transmitter, signal delay on the transmission channel and time delay for reconversion, decoding, checking, etc., in the telecontrol receiver. However it does not include the response time of peripheral input and output devices, such as interposing relays, signal lamps, transducers, indicating instruments, etc.

Telecounting; transmission of integrated totals

The transmission of the values of measurable quantities which are integrated over a specified parameter, such as time, using telecommunication techniques (IEV 371-01-05).

NOTE - The integration may take place before or after transmission. If integration takes place before transmission the expression "transmission of integrated totals" is used.

Teleindication; telesignalization (deprecated)

The telemonitoring of status information such as alarm conditions, switch positions or valve positions (IEV 371-01-04).

Teleinstruction

The transmission, using telecommunication techniques, of switching and/or adjusting instructions to a station for manual operation (IEV 371-01-09).

NOTE – Teleinstructions are usually presented by visual means.

Telemetering

The transmission of the values of measured variables using telecommunication techniques (IEV 371-01-03).

Telemonitoring

The supervision of the status of operational equipment at a distance using telecommunication techniques (IEV 371-01-02).

Teleprotection

An all-embracing expression covering the exchange of monitoring and command information between two or more stations in order to protect operational equipment. Further specific terms are: carrier protection system, microwave protection system, communication-aided distance protection system.

Teleregulation

The combination of telemonitoring and telecommand facilities in a closed loop, generally including an automatic decision-making part (IEV 371-01-10).

Telesignalization see *Teleindication*

Teleswitching

The telecommand of operational equipment having two determined states (IEV 371-01-07).

NOTE – Some equipment can only be controlled to one of two determined states, e.g. resetting of tripping relays.

Threshold transmission

Transmission of measurands only if they change more than given thresholds (min./max.).

Time resolution, limit of accuracy of chronology

The minimum time by which two events must be separated in order that the corresponding time tags be different (IEV 371-05-03).

NOTE - The time resolution cannot be shorter than the separating capability.

Time tagging see *Absolute chronology*

Transducer

A device which accepts information in the form of a physical quantity (its input variable) and converts it to information in the form of the same or another physical quantity, according to a definite law (2).

Transient information see *Fleeting information*

Transit station

An intermediate station through which messages or signals are switched (IEV 371-06-03).

Transition time

The time a signal needs to pass from a specified state to another one including the acquisition time.

Transmission efficiency

The ratio of correctly transferred user data bits to the total number of transmitted bits.

Transmission error alarm

Information indicating that an erroneous transmission signal has been detected (IEV 371-04-09).

Transmission of change-of-state information chronologically

The information on changes of state or events is transmitted in the order of their occurrence provided that they do not occur within intervals shorter than the separating capability.

Transmission of change-of-state information in an order of priority

Information on changes of state or events that occur in an interval of specified length is transmitted in an order of priority specified by the user.

Transmission of integrated totals see *Telecounting*

Transmission on demand

A transmission method in which messages are transmitted only as a result of a request such as an interrogation command from a control centre or master station (IEV 371-07-03).

Transmission with decision feedback

A transmission method in which the receiving station transmits a positive or negative acknowledgement to the initiating station (IEV 371-07-04).

Transmission with information feedback

A transmission method in which the receiving station retransmits the complete information to the initiating station where it is compared to verify that the information content is the same as that originally transmitted (IEV 371-07-05).

Unbalanced circuits; unbalanced line

A transmission line in which the magnitudes of the voltages on the two conductors are not equal with respect to ground (5).

Updating time, refresh time

The time between a change of state in an outstation and its registration in the control centre or master station (IEV 371-08-20).

NOTE - In cyclic systems, the average updating time is equal to one half of the cycle time plus the overall transfer time.

Undetected error rate see *Residual error rate*

Uptime

The period of time during which an item is in a condition to perform its required function (7).

Window size

The number of frames that are transmitted before automatic repeat requests begin in case of detected frame errors.

Word

A character string, binary element string or bit string that is considered as an entity (5).

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